

## THE EMF STALEMATE: AN UNEXPLORED WAY OUT

Simon Berkovich  
Dept. of EE&CS  
The George Washington University  
Washington, DC 20052

For about two decades, the investigation of the alleged health hazards from electro-magnetic fields (EMF) (see, e.g. [1]) has been caught in a confrontation between physical and epidemiological judgements. On one hand, it appears that being small in a relative and absolute sense magnetic fields from power lines cannot produce a discernible bio-medical effect. On the other hand, numerous studies consistently show a "weak, but statistically significant" link of power lines with some harmful effects like childhood leukemia. So, it has been officially proclaimed that "even with more research, there will be no scientific resolution to the EMF issue in the near future" [2]. Recently, the concluding Working Group report [3] on the comprehensive EMF study has underscored this stalemate situation.

To break the vicious circle of these debates, the physical and epidemiological positions have to be reconciled. From a logical standpoint these two confronting positions can be true simultaneously: they are opposite, not contradictory. This means that a biological impact from power lines can exist but it is due to some factor other than EMFs. Actually, epidemiological studies show an association of the observed effects with calculated magnetic fields rather than with contemporaneously measured (spot) fields. Thus, trusting in both epidemiological and physical analysis, one comes to the conclusion that the carcinogenic action attributed to EMFs is determined by the proximity to electrical wires of which the magnetic field is just an indicator [4].

In view of contemporary physics, the supposition that mere proximity to an electrical wire may cause a bio-medical effect looks absurd. Similarly, in view of the last century physics, before the discovery of Henri Becquerel, it might look absurd even to consider that staying in proximity to some substances can pose a health risk. It has to be clearly understood that the surmised impact from electricity relies on a hypothesis of a new yet not recognized physical phenomenon. Sticking to the authority of Maxwell equations and challenging the epidemiological data one gets in the vicious circle again. Presumably, validating a new phenomenon should be primarily concerned with experimental testing. But according to a well-known ironic parable attributed to Arthur Edington: "one should never believe any experiment until it has been confirmed by theory".

Ordinarily, material objects are assumed to influence each other through mediative agents. Here we suggest to explore a different mechanism in which a material object may influence another one without any mediating agent at all. This possibility involves the infrastructure underlying the physical world, a natural one-step extrapolation below the level of the material world. Usually, such an infrastructure is associated with quantum vacuum having a capability to get "something out of nothing". Further theoretical discussion in this direction would make sense only if the hypothesized outcomes were actually observed in the proposed experimental testing.

A simple possibility for a non-mediative impact can be rendered by aftereffects. Assume that a material object creates some disturbances in its position in the infrastructure underlying the physical world and that these disturbances can influence a trailing object which relocates to this position shortly thereafter. An arrangement for this kind of an aftereffect is illustrated in the following diagram:



A. Aftereffect is possible

B. No aftereffect influences

In experimental testing, biological objects have to be exposed to the presence of high-voltage lines not to "an equivalent magnetic field". In the aftereffect scheme the "proximity impact" occurs when the absolute velocity of the Earth is lined up in the direction: biological object-electrical wire. In ordinary circumstances, the durations of the alignment conditions are short. The action of such an impact can be increased with a continuous repositioning of the object to compensate for misalignment arising due to rotation of the Earth. So, a normally diluted dose of "proximity impact" can be delivered in a concentrated form and it is conceivable that some biological transformations might be even noticeable right on the spot. Anyhow, in the suggested experiment, contrary to common prospects, the observed outcomes are anticipated to be amplified with one orientation and attenuated with another.

At first glance, one may get the wrong impression that a hypothesis relying on an absolute infrastructure of the physical world contradicts the fundamental physical notion of relativity. In the prevalent popular interpretation of relativity, the question of whether there is an absolute frame of reference of the physical world seems to have been resolved once and for all in a negative sense by the Michelson-Morley and similar experiments. However, the concept of relativity can be presented in two interpretations: according to Einstein the absolute frame of reference does not exist, according to Lorentz, Poincaré, and others the absolute frame of reference is simply undetectable. Strictly speaking, the concept of relativity addresses only the undetectability of uniform translational motion in mechanical, optical, and electromagnetic experiments. The possibility of observing other attributes of absolute space in other types of experiments is not excluded.

In the Lorentz-Poincaré interpretation the phenomena of relativity are easier to comprehend. It is especially advocated in [5] that there is tremendous merit to accepting Lorentzian pedagogy even without accepting Lorentzian philosophy. Obviously, the facts of physics are compatible with either of these philosophies, so accepting either one of them does not imply a significant change in the routine practice of physics, not to mention any catastrophic revision of established physical laws. According to the suggested hypothesis, the health hazardous effects from electrical wires attributed to EMFs may reveal a novel facet of reality: dependence of some kind of events on the absolute positioning of the material objects involved. Thus, favoring the Lorentz-Poincaré philosophy could open new avenues in biology while leaving Einsteinian physics intact.

Finally, one might wonder how a minor point in environmental studies has raised to a status of a problem of universal scientific significance. The alleged effects of infrastructure influences are small and would be disregarded in common practice as strange transient flukes. Serendipitously, such effects can reveal themselves under two conditions: if actions of these effects are cumulative and if their outcomes are subject of registration. Public concern about carcinogenic action of the omnipresent "electropollution" leads to an exclusive situation where both of the conditions for unintentional observations of tiny unexpected effects are satisfied. In specially designed experimental investigations, the influences of the infrastructure mechanism could be exposed in a more conclusive way.

## References

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